1053 Computer Assisted Patient Care

Tuesday, March 26, 1996, Noon–3:30 p.m.
Orange County Convention Center, Hall C

1053-1 Computer Based Warfarin Patient Tracking System

Scott S. Kaatz, Stephen T. Smith, Syed M. Jafri. *Henry Ford Health System, Detroit, MI*

Objectives: To develop a software system for tracking patients on warfarin that is easy to use on a daily basis, yet sophisticated enough to capture critical data, making it more convenient to obtain quality assurance (QA) and outcome measurements in a large, multi-clinic, outpatient population.

Background: Broadening indications for anticoagulation and the general aging of the population has led to a significant increase in the number of patients needing oral warfarin therapy. With this increase, comes the greater challenge of managing and keeping track of those patients. Increased patient loads without the proper systems in place to manage them, can potentially lead to increased numbers of patients lost to follow-up and an overall decrease in the efficient use of staff time.

Method: A multi-disiplinary team, comprised of Henry Ford Health System (HFHS) personnel, was formed to define the specific needs for the development and operation of a multi-site, computer based, outpatient anticoagulation monitoring service (AMS) that would maximize efficiency and minimize variability in the administration of warfarin in HFHS.

Results: Based on the identified needs, the customized HFHS Coumadin® (Warfarin Sodium) Patient Tracking System was developed. To help ensure that patients are not lost to follow-up, the system helps the clinician identify patients that have missed their scheduled appointment. To help manage dosing adjustments, the system distributes a total weekly milligram amount across a seven-day repeating schedule based on a single tablet strength. To help assess the effectiveness of the therapy and the AMS, QA reports are available and are sortable by diagnosis, doctor, medical site and time period. By using these QA reports and standardizing the delivery of anticoaguiant therapy, HFHS hopes to improve the overall quality of care given to patients and maximize the efficient use of staff time.

1053-2 Improved Access to Data: Production of Automated Reporting

William S. Weintraub, Andrzej Kosinski, Yannan Shen, Christi D. Warner. *Emory University, Atlanta, GA*

The changing health care environment has resulted in an ever increasing demand for data for both evidence based medicine and financial accountability, for internal consumption and managed care. The components necessary for reporting are careful, consistent data gathering, storage in computerized database, retrieval, analysis and display. The traditional statistical method of preparing data is retrieval from the database, analysis with a statistical package, and abstraction from statistical outputs for tables in papers. Figures are often laboriously constructed one at a time. These methods used for ad hoc queries, generally aimed at peer reviewed publication, are not suitable for regular reporting as they are overly labor intensive for repetitive tasks. An alternative is to prepare entire reports from a database, perhaps with statistics or figures prepared automatically from spreadsheets, which may be incorporated into word processing by OLE. We use this approach for some applications, but find it limited in statistical and graphics capability. We have successfully employed a different strategy in which carefully constructed retrieval programs using Informix 4gl prepare flat files which are read directly into Splus dataframes. Splus programs prepare reporting with embedded text processing commands, either Latex or Troff. This permits extremely detailed, flexible reports with detailed statistical presentations and inference testing. SAS routines may be embedded in Splus where needed. Graphics can be created within Splus or data can be combined with embedded Grap (Troff graphics preprocessor) commands. Graphics such as fully annotated survival curves can be automatically produced and then reproduced with updated data. Output can be printed or displayed with a viewer for postscript files such as Ghostscript. The output may be broadcast to any computer on the medical center network. This approach has allowed the creation and easy dissemination of detailed clinical outcome data on a regular basis with minimal labor.

1054 Ultrasound Analysis by Computer

Wednesday, March 27, 1996, 7:30 a.m.–11:00 a.m.
Orange County Convention Center, Hall C

1054-1 Intravascular Ultrasound: A User Friendly Public Domain Software Package for Measuring and Reporting Results

James G. Hoff, William D. Anderson, Nina Vincent-Sewell, Spencer B. King III, J. Larry Klein. *Emory University, Atlanta, Georgia*

We have developed a set of macros that easily leads the user through the process of analyzing and reporting off-line intravascular ultrasound (IVUS) images. The software is based on NIH Image, a widely utilized, user friendly, public domain imaging software package for Macintosh™ computers. IVUS images captured on videotape are digitized into the computer with the push of a key. With the mouse, the operator marks the center of the IVUS catheter and then simply outlines the borders of the vessel lumen and media adventitia. The degree of calcification is measured with three mouse clicks. The computer then performs calculations including: lumen area, plaque area, 36 radial measurements of plaque and lumen, stenosis in terms of % area and averaged diameter, lesion eccentricity, and catheter offset. Images following an intervention can be similarly processed allowing the computer to calculate the net change in plaque and lumen dimensions. The quantitative results are immediately displayed. The results and images can be printed, saved for later reference or electronically pasted into other applications. We have interfaced the results to our clinical database so that IVUS data can be reviewed and analyzed alongside routine clinical information. With this system, off-line IVUS image analysis can be performed easily and inexpensively, allowing for timely reporting and gathering of data for clinicians and researchers.

1054-2 Multimedia System for Fetal Echo Analysis

Zhi Yun Tian, Piotr M. Wróblewski, Krzysztof P. Wróblewski. *Children's Hospital of Philadelphia, Philadelphia, PA; University of Pennsylvania, Philadelphia, PA*

Complete fetal echographic study generally involves three methods of investigation: two-dimension echo, M-mode echo, and Doppler interrogation. Introduction of *computed sonography* (in 1983), based on a hybrid analog/digital computer designed to obtain real time images, dramatically improved a quality and resolution of pictures. However, the software which controls image formation and all other functions lacks ability to help in analysis of obtained results. That is why even though more and more pregnant woman are offered ultrasound scan (in some countries all), the detectibility of congenital heart diseases is lower than one could expect. To remedy this situation a Windows® based Multimedia computer program called "Fetal Echo" has been developed. The application includes step by step tutorial to instruct the user in reading Fetal Echo data, a browsing library of definitions of CHD's, over 300 digitized echocardiograms and graphics images, and the *Expert System* for automatic diagnosis. The database can be viewed by searching for the defect name or symptoms. The pictures, images and descriptions are linked using hypertext and form an intelligent textbook. This provides a powerful instructional tool in this very difficult area of medical education.

The minimum hardware requirements to run this program are: IBM/PC or compatible computer running MS Windows® version 3.1 or later, 8 MB RAM, multimedia with dual speed CD ROM, and VGA card capable to display at least 256 colors.

1055 Cardiac Image Distribution by Computer

Wednesday, March 27, 1996, Noon–3:30 p.m.
Orange County Convention Center, Hall C

1055-1 Multimedia Instructional Tool for Angiocardiography of Congenital Heart Disease

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Angiocardiography for congenital heart disease is generally performed in biplane projections for diagnostic and interventional purposes. A clear understanding of the two dimensional pictures obtained in biplane projections is necessary for adequate patient management. To simplify the process of learning these skills, a computer program has been prepared on the Macintosh computer platfom. A commercially available 3-D rendering program has been used for 3-D simulation of cardiac images. The shadow that various components of the heart would cast during angiographic imaging can then be studied by moving the "camera" in the software program to different